CMSC 643: Quantum Computation & Quantum Information
Tentative Syllabus

Instructor: Professor Samuel Lomonaco

Contact Information:
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    Course WebPage: https://www.csee.umbc.edu/~lomonaco/Teachings19.html

Textbook:
    Thomas G. Wong
    Introduction to Classical and Quantum Computing
    Published by Rooted Grave, Omaha, Nebraska
    ISBN: 979-8-98559321-0-5 (Paperback) (Hardcover also available)
    Public Domain E-Copy

Course Description:
    The course will begin with a brief overview of those topics in quantum mechanics and
    mathematics needed for the understanding of quantum computation. An incomplete list of
    topics covered in the course is given below:

        Quantum superposition and quantum entanglement
        Quantum decoherence and the resulting implementation barriers
        Quantum teleportation
        Quantum Turing machines
        Shor's Algorithm
        Grover's algorithm
        Quantum information theory
        Quantum data compression
        Quantum cryptographic protocols
        Quantum error-correcting codes
        The search for a physical implementation of a scalable quantum computer
        Various research level problems

Other Resources:

[Other Books](#), [Four Lectures on Quantum Computation](#), [Two Slides on Quantum Measurement](#), [Tutorials](#), [AMS Short Course Lecture Notes](#), L-O-O-P [Lecture Notes](#), [arXiv](#), [Davis Front End for ArXiv](#)

Prerequisites: An algorithms course, a linear algebra course, and an intense desire to learn.

Method of Evaluation: Homework: 25%, Exam1: 25%, Exam2: 25%, Final Exam: 25%.

Administrative Policies:
On the date a homework or project is due, a hardcopy is to be handed in at the beginning of class. On that day, any homework or project handed in 10 minutes after class begins is deemed LATE. A LATE homework or project will not be accepted.

Electronic submissions of homework or project will not be accepted without prior permission of the instructor. If a student has instructor prior permission for electronic submission, then the homework or project is to be electronically submitted to the course grader, NOT to the instructor.

Exams will be given only at the scheduled times. There are No make-up exams.

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Covid-19 Safety Protocols and Compliance Requirements

Philip Rous, Provost
Orianne Smith, Faculty Senate President
The Covid-19 Academic Coordinating and Planning Committee

"UMBC has set clear expectations for masking while on campus that include the requirement that you must wear a face mask that covers your nose and mouth in all classrooms and labs regardless of your vaccination status. This is to protect your health and safety as well as the health and safety of your classmates, instructor, and the university community. Anyone attending class without a mask or wearing one improperly will be asked by the instructor to put on a mask or fix their mask in the appropriate position. Any student that refuses to comply with this directive will be asked to leave the classroom immediately and failure to do so will result in the instructor requesting the assistance of the University Police. Students who refuse to wear masks may be referred to Student Conduct and Community Standards and may face disciplinary action for violations of the Code of Student Conduct, specifically, Rule 2: Behavior Which Jeopardizes the Health or Safety of Self or Others and Rule 16: Failure to Comply with the Request of a University Official. UMBC's on-campus safety protocols, including masking requirements, are subject to change in response to the evolving situation with Covid-19"